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Maternal Characteristics Associated with Stunting Incidence: A Cross-Sectional Study

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ABSTRACT

Background: In Indonesia, stunting remains a very serious challenge for public health development. Nationally, the stunting prevalence in 2023 was 21.6% which was still above the threshold set by WHO.
Purpose: This study aimed to analyze maternal characteristics with stunting occurrence at Puskesmas Air Periukan.
Methods: The study used a quantitative analytical approach with a cross-sectional design. The target population comprised all mothers with toddlers aged between 6 and 59 months. The sample were 65 mothers that were selected using purposive sampling technique. Questionnaire, that its validity and reliability had been previously established by the research team, was used in collecting the data. The data then analyzed using the chi-square test and multinomial logistic regression.
Results: A highly significant correlation was observed for maternal age, parity, and family income. Conversely, the variables of education, occupation, and maternal knowledge had no significant correlation. The multivariate test results showed that age could increase the stunting occurrence by 1.084 times (OR = 1.084, 95%CI: 0.256-97.697), while the income factor increased the stunting risk by 2.153 times (OR = 2.153, 95%CI: 0.056-8.822).
Conclusion: Stunting in children under five is influenced by maternal age, parity, and family economic status. Healthy reproductive age and having fewer children reduce the risk of stunting. Conversely, maternal education, knowledge, and employment do not have a significant impact. Low economic conditions are the primary factor increasing the risk of stunting.

Keywords: stunting; maternal characteristics; cross-sectional study

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BACKGROUND

Stunting is an indicator of poor nutritional status that describes a state of impaired physical growth in children under the age of five resulting from protracted chronic malnutrition, in the critical first 1,000 days of life. Its impact is not only physical, such as height inappropriate for age, but also touches cognitive, psychological, and social aspects, which cumulatively can affect the quality of a nation's human resources (UNICEF/WHO/WORLD BANK, 2021). Children affected by stunting are predisposed to exhibit diminished cognitive capacities, reduced economic productivity in their adult years, and an elevated susceptibility to non-communicable diseases(DM and cardiovascular) (Nafisah & Astuti, 2023; Nambiar et al., 2023).

Within Indonesia's public health development efforts, stunting continues to represent a significant impediment. The SSGI 2022 indicated a national stunting prevalence of 21.6%, underscoring the magnitude of this issue (Shinde et al., 2021). Despite a decrease compared to previous years, this observed figure exceeds the 20% threshold established by the WHO and falls significantly short of the Indonesian government's target of achieving a 14% stunting rate by 2024, as stipulated in the 2020-2024 RPJMN. The unevenness of stunting prevalence between regions and disparities between social groups indicate that this problem is not only related to biological factors, but is also strongly influenced by social, economic and environmental factors (Fadlliyyah, 2019).

The role of mothers as primary caregivers is a critical component that influences child health, especially in preventing stunting. Age, education level, employment status, parity and access to health information are all factors that strongly influence maternal parenting, feeding and health service utilisation. Early prevention of stunting depends on mothers' knowledge of nutrition, sanitation, immunisation and danger signs in child development (Wemakor et al., 2018).

Various studies have shown that many mothers lack sufficient knowledge about the concept of stunting, its consequences, and preventive measures. Low levels of maternal health literacy contribute to suboptimal parenting decisions, such as delaying the initiation of breastfeeding, not exclusively breastfeeding for the first six months, or providing complementary foods that are inappropriate for the child's age and nutritional needs (Onah, 2021). The association between these factors and maternal education level was strong (Kang et al., 2017). Findings from a distinct study indicated that multiple variables, including age and educational status, can influence mothers' low level of knowledge about stunting (Asra & Aji, 2023; Vir, 2016).

OBJECTIVE

This study aimed to investigate the maternal characteristics and stunting the incidence in infants within the age range of 6 to 59 months at the Air Periukan Health Centre Working Area.

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METHODS

This was an analytical study with a cross sectional design at the Air Periukan Health Centre Working Area on 1 - 30 November 2024. All mothers with children aged 6 to 59 months (n=78) constituted population, and a sample of 65 mothers was drawn from this population using a purposive sampling. Inclusion criteria: 1). Mothers whose children under five (0-59 months) who have been identified as stunted based on anthropometric measurements (TB/U < -2 SD according to WHO Growth Standards), 2). Mothers who live in the Air Periukan Health Centre area, 3). Mothers meeting the criteria for inclusion as respondents and having provided written informed consent. Ethical considerations in this study were to maintain the confidentiality of respondent data, then provide a consent form containing information about research procedures, and explain the risks and benefits of being a respondent in this study. Before conducting the research, the author obtained ethical approval from the Ethics Committee of STIKES Banyuwangi with the reference number 276/02/KEPK-STIKESBWI/XII/2024-2025. Therefore, the steps taken include providing informed consent, using anonymised data. The exclusion criteria were: 1). Mothers whose toddlers had congenital medical conditions or chronic diseases that could affect growth, such as genetic disorders or metabolic disorders. 2). Mothers who experience mental or cognitive impairment that inhibits the ability to provide valid and consistent information. Data were collected through a questionnaire, the validity and reliability of which had been previously established by the researcher, then analyzed using chi-square tests and binary logistic regression, given the dichotomous nature of the stunting outcome.

RESULTS

Table 1. Respondent Characteristics

Characteristics	Frequency (n)	Percentage (%)
Age		
20-35 years	36	55,4
< 20 and ≥ 35 year	29	44,6
Parity		
Primigravida	23	35,3
Multigravida	42	64,7
Work		
Working	44	68
Not Working	21	32
Education Level		

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Characteristics	Frequency (n)	Percentage (%)
Primary-Middle	48	74
Higher	17	26
Income		
Low	42	65
Normal–High	23	35
Knowledge		
Moderate knowledge	27	42
Good knowledge	38	58

From the table above, it can be concluded that the largest proportion of mothers were aged between 20 and 35 years (55.4%) and were multigravida (64.7%). The majority of respondents were employed (67.7%) and had primary to secondary education levels (73.8%). Most came from families with low income (64.7%). In terms of knowledge, A majority of the respondents demonstrated a satisfactory level of knowledge regarding the phenomenon of stunting (58.5%).

Table 2. Incidence of Stunting

Stunting	Frequency (n)	Percentage (%)
Yes	14	22
No/Normal	51	78
Total	**65**	**100**

Of the total 65 respondents studied, 14 people (21.5%) were known to be stunted. Meanwhile, the majority of 51 (78.5%) respondents were in normal condition or did not experience stunting.

Table 3. Bivariate Analysis Results

Variable	Stunting		Normal		Total	P - value
	n	%	n	%		
Age						
20 – 35 years	12	44	15	56	27	0,000
< 20 and ≥ 35 years	2	5	36	95	36	
Parity						
Primigravida	1	4	22	96	23	0,013
Multigravida	13	31	29	69	42	
Education Level						
Primary-Middle	13	27	35	73	48	0,068
Higher	1	6	16	94	17	
Work						

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Variable	Stunting		Normal		Total	P - value
	n	%	n	%		
Working	8	18	26	82	44	0,421
Not Working	6	29	15	71	21	
Income						
Low	14	33	28	67	42	0,001
Normal–High	0	0	23	100	23	
Knowledge						
Moderate knowledge	9	33	18	67	27	0,51
Good knowledge	5	13	33	87	38	

The data presented in the preceding table indicate a statistically significant association between maternal age, parity, and family income, and stunting, as supported by p-value <0.05.

Tabel 4. Multivariate Analysis

Variable	p - value	OR	95% CI	
			Lower	Uper
Age	0,000	1,084	0,256	97,697
Parity	0,099	1,202	0,721	138,678
Income	0,006	2,153	0,056	8,822

Table 4 shows that the age variable has an odd ratio (OR) value of 1.084, this means that age was found to have positive effect on the likelihood of stunting occurrence. While the income factor increases stunting risk by 2.153 times.

DISCUSSION

The statistical analysis demonstrated a significant correlation between maternal age and stunting (p = 0.002). The predominant age category among the maternal respondents was 20-35 years, comprising 55.4% of the sample, with the remainder being outside this specified interval (<20 and ≥35 years) by 44.6%. Age is one of the important determinants in the aspect of reproductive health, especially in relation to physical and psychological readiness in facing pregnancy. Age 20-35 years is categorized as a healthy reproductive age, which generally has a lower risk of pregnancy complications compared to adolescence and advanced reproductive age. It aligns with (Halimatunnisa et al., 2020; Simelane et al., 2020), the optimal age of pregnant women is positively correlated with readiness and involvement in antenatal care. Maternal age is posited to influence a mother's capacity and experiential background in providing adequate nutrition to her children. Advancing maternal age is associated with not only accumulated experience but also an increased acquisition of knowledge from diverse

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sources (Nafisah & Astuti, 2023). In contrast, states there is no significant correlation between maternal age and stunting in children under five. Scholarly investigations suggest that maternal age is an indirect determinant of stunting, with other variables exhibiting a more proximate influence on nutritional status. These factors include direct influences such as dietary intake (energy and protein) and a history of infectious morbidities, as well as indirect influences such as birth weight history, socioeconomic status, and the practice of exclusive breastfeeding (Gresh et al., 2019; World Health Organization Regional Office for the Eastern Mediterranean, 2022).

The analysis revealed that neither maternal education nor knowledge demonstrated a significant correlation with the occurrence of stunting. These results suggest that even though mothers with higher educational attainment have greater facility in locating and receiving information do not necessarily have the willingness to provide nutritious intake for children. A high degree of maternal knowledge does not invariably translate to toddlers with optimal nutritional status. It is expected that mothers possessing sound knowledge would be able to implement this understanding in their daily practices. It aligns with (Melo et al., 2021), where the maternal role is critical in the genesis of children's alimentary behaviors, owing to the mother's primary responsibility for the comprehensive management of food, including menu conceptualization, ingredient acquisition, culinary processing, meal arrangement, and food allocation.(Janmohamed et al., 2020) states a different thing, maternal education is posited to affect the prevalence of stunting in toddlers. Lower educational attainment in mothers may have ramifications for parenting styles and child care practices, in addition to influencing the selection and presentation of alimentary provisions for their children. Ensuring that toddlers receive suitable ingredients and menus to improve their nutritional status is contingent upon mothers having a good level of nutritional knowledge. Mothers with higher educational attainment generally find it easier to understand nutritional information, especially concerning the selection and processing of nutritious foods to fulfill familial nutritional needs compared to mothers with lower education. This is in line with what was conveyed, which states that a mother's limited education and understanding of nutrition can lead to an inability to make informed choices and provide meals for the family that meet the criteria for balanced nutritional adequacy. Insufficient food consumption will cause an imbalance in metabolic processes in the body. If this happens continuously, this can lead to growth and developmental impairments in children, including conditions such as stunting.

In contrast, mothers with greater educational attainment frequently work outside the home, resulting in children being cared for by grandmothers or other family members. This situation may compromise the mother's capacity to perform her role to its fullest extent. Notably, the study results showed no significant association between maternal employment status and stunting. Working mothers are has a direct bearing on the time allocated for breastfeeding and child care, consequently influencing child nutrition.

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While it can positively contribute to increased family income, it may also negatively affect the guidance and supervision, especially in maintaining the nutritional intake of toddlers.

Parity is also one of the factors that cause stunting according to this finding, there is a very significant relationship. the majority of respondents were multigravida (64.7%) compared to primigravida (35.3%). The high proportion of multigravida indicates that most respondents have had previous experience in pregnancy, which has the potential to affect their knowledge and behaviour in dealing with subsequent pregnancies. As explained (Twells et al., 2016), previous pregnancy experience plays an important role in shaping risk perceptions and increasing maternal readiness in making health decisions. Research conducted, said that a higher probability of stunting was observed indicated a higher likelihood of stunting among children from households with 2-3 children (Adjusted Odds Ratio [AOR] = 1.48, 95% CI: 1.16, 1.89) and those from households with four or more children under five years (AOR = 1.74, 95% CI: 1.08, 2.81) when contrasted with children in single-child households. Where the number of children will affect food consumption, namely the total and distribution of food in the household, with a large number of children followed by uneven food distribution will cause children under five to experience malnutrition. The theory presented by Rahayu et al., (2019), where the factors that cause stunting include the number of household members who say that. The quantity of family members affects food consumption. The increasing number of family members without being balanced by increasing income will cause the distribution of food consumption to be more uneven. exhibit a fourfold increased likelihood of experiencing food insecurity compared to households with a smaller member. In addition, the risk of malnutrition is 5 times greater than that of families with small family members. Stunted toddlers are more common in families with 2-3 children, compared to families with <3 children.

Economic status factors are also a cause of stunting in toddlers which includes per capita income. The results showed that the income factor increased the risk of stunting by 2.153 times. Economic factors in the Air Periukan area are closely related to the occupational structure of the population. Based on available demographic data, the majority of people in this area depend on the agricultural sector. Farming activities are not only the backbone of the family economy, but also part of the social identity of the Air Periukan community, and most housewives are involved in agricultural activities. Economic status is an important determinant in the fulfilment of nutritional needs and child feeding practices, which greatly contributes to efforts to prevent malnutrition and stunting (Ariani, 2020). Low socioeconomic status is regarded as having a substantial impact on stunting. The economic circumstances of the family affect the mother's capacity to access healthcare services and fulfil nutritional needs during pregnancy. Financial limitations are often an obstacle in efforts to optimise maternal health and

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influence the stunting, as described in their research showing that Parental economic level is related to the risk of stunting. Halimatunnisa et al., 2020, found Household income is identified as the most influential factor affecting the likelihood of stunting in children under five. Families with incomes less than the minimum wage are 6.625 times more likely to have stunted children under five.

This study demonstrates notable strengths, particularly in the application of an appropriate cross-sectional design to identify associations between maternal characteristics and the incidence of stunting. The measurement instruments employed were previously validated and tested for reliability, ensuring the credibility of the data collected. Furthermore, the statistical analyses were conducted comprehensively, incorporating both chi-square tests and multinomial logistic regression. The research's specific geographical focus also contributes to the contextual relevance of the findings, offering valuable insights for targeted local interventions.

The primary limitation of this study lies in its cross-sectional design, which precludes the establishment of causal relationships. The relatively small sample size restricts the generalizability of the findings. Moreover, several important variables, such as maternal nutritional status and sanitation conditions, were not included in the analysis. Additionally, the study lacks sufficient methodological justification for the application of multinomial logistic regression to dichotomous data.

It is recommended that future research employ a longitudinal design with a larger sample size and broader geographic coverage. Subsequent studies should also incorporate additional relevant variables, such as nutritional status and environmental conditions, to enhance the comprehensiveness and validity of the findings.

CONCLUSION

The analysis revealed a statistically significant relationship between maternal age, parity, and income and the incidence of stunting in toddlers. Specifically, maternal age exhibited a positive association with stunting, while an increase in income was found to elevate the risk of stunting by a factor of 2.153. Conversely, no significant relationships were observed between maternal education, occupation, and maternal knowledge and the occurrence of stunting in toddlers.

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